

Claims:

What is claimed is:

1. A penile prosthesis comprising:
 - at least one cylinder;
 - a reservoir; and
 - a pump for transferring fluid between the reservoir and the at least one cylinder,the pump comprising:
 - a pump housing;
 - at least one reservoir channel fluidly coupling the pump housing to the reservoir;
 - at least one cylinder tube fluidly connecting the pump housing to the at least one cylinder;
 - a fluid passageway fluidly coupled to the at least one cylinder tube and a transfer chamber, wherein the transfer chamber is fluidly coupled to the reservoir channel;
 - a first poppet biased toward a first valve seat within the fluid passageway;
 - a second poppet biased toward a second valve seat and generally in alignment with the first poppet within the fluid passageway;
 - a bypass chamber fluidly connected by a bypass input channel to the fluid passageway at a first location and fluidly connected by a bypass output channel to the fluid passageway at a second location, the bypass chamber comprising a bypass check valve biased toward a closed position; and
 - a pump bulb fluidly connected to the fluid passageway between the bypass input channel and bypass output channel along the length of the fluid passageway.
2. The prosthesis of claim 1, wherein the first poppet comprises an elongated body having an extending face seal portion, and wherein the fluid passageway comprises a flange extending toward the interior of the fluid passageway for engagement with the face seal portion of the first poppet when the first poppet is displaced by a sufficient distance from the first valve seat.

3. The prosthesis of claim 2, wherein the fluid passageway further comprises a lip seal portion that extends generally from the second poppet toward the first poppet, wherein the first poppet is slideably moveable into contact with the lip seal to prevent fluid from moving between the pump bulb and the fluid passageway adjacent the second poppet.

4. The prosthesis of claim 3, further comprising a cylinder inflation mode in which the face seal portion of the first poppet is seated against the first valve seat, the lip seal portion is spaced from the first poppet, and the pump bulb is compressible for forcing enough fluid under pressure from the pump bulb into the fluid passageway to unseat the second poppet from the second valve seat and allow fluid to move past the second poppet and enter the at least one cylinder tube.

5. The prosthesis of claim 3, further comprising a pump bulb filling mode in which the lip seal portion is in contact with the first poppet and the pump bulb is expandable to place the fluid passageway and transfer chamber under negative pressure to thereby unseat the face seal portion of the first poppet from the first valve seat against the bias of a first poppet spring and draw fluid into the pump bulb.

6. The prosthesis of claim 1, wherein the at least one cylinder is expandable in response to movement of pressurized fluid from the reservoir through the pump and into the at least one cylinder, thereby pressurizing the fluid within the at least one cylinder.

7. The prosthesis of claim 3, wherein the pump has a deflation mode in which compression of a portion of the pump body moves the first poppet into sealing contact with both the lip seal portion and the second poppet to unseat the second poppet from the second valve seat to provide a gap between the second poppet and the second valve seat for pressurized fluid to flow from the at least one cylinder past the second poppet and into the bypass chamber through the bypass input channel.

8. The prosthesis of claim 7, wherein a fluid pressure level of fluid flowing from the at least one cylinder into the bypass chamber is sufficient to unseat the ball from the ball valve seat and allow fluid to flow through the bypass output channel and into the transfer chamber of the pump housing.

9. The prosthesis of claim 7, wherein the ball check valve is not openable by a flow of pressurized fluid from the fluid passageway into the bypass output channel.

10. The prosthesis of claim 7, wherein the first poppet remains in contact with the second poppet and the second poppet remains unseated from the second valve seat when the pump body is not under compression.

11. The prosthesis of claim 1, wherein the reservoir is fluidly connected to the reservoir channel by at least one reservoir tube.

12. The prosthesis of claim 1, wherein the pump housing is partially compressible generally along an axis that runs longitudinally through the fluid passageway so that a compression of the pump housing at generally opposite ends of the fluid passageway will displace at least one of the first and second poppets.

13. The prosthesis of claim 1, wherein the reservoir channel is an opening extending from the transfer chamber through the pump housing for fluidly connecting the transfer chamber to the reservoir.

14. The prosthesis of claim 1, wherein the reservoir comprises an outer reservoir membrane surrounding at least a portion of an internal reservoir chamber, wherein the reservoir chamber can expand from a first internal volume to a second internal volume that is larger than the first internal volume by the addition of pressurized fluid.

15. The prosthesis of claim 14, wherein the pump housing comprises a lower face surface and wherein the reservoir chamber is defined by the reservoir membrane and at least a portion of the lower face surface of the pump housing.

16. The prosthesis of claim 15, wherein the lower face surface is resistant to deformation by the pressure of fluid being held within the reservoir chamber.

17. The prosthesis of claim 15, wherein the reservoir membrane can expand when a volume of fluid entering the reservoir chamber is greater than a first internal volume of the reservoir chamber.

18. The prosthesis of claim 15, wherein the reservoir functions as an energy-storing device when a volume of pressurized fluid in the reservoir chamber forces the reservoir membrane to expand.

19. The prosthesis of claim 1 wherein the bypass check valve comprises a ball biased toward a ball valve seat within the bypass chamber.

20. The prosthesis of claim 3, wherein the lip seal portion is annular.

21. The prosthesis of claim 1, further comprising a filling port fluidly connected to the transfer chamber for adding a predetermined volume of fluid to the prosthesis.

22. A pump for transferring fluid between a reservoir and at least one cylinder within a penile prosthesis, the pump comprising:

- a pump housing;
- at least one reservoir channel for fluidly coupling the pump housing to a reservoir;
- at least one cylinder tube for fluidly connecting the pump housing to at least one cylinder;

a fluid passageway fluidly coupled to the at least one cylinder tube and a transfer chamber, wherein the transfer chamber is fluidly coupled to the reservoir channel;

a first poppet biased toward a first valve seat within the fluid passageway;

a second poppet biased toward a second valve seat and generally in alignment with the first poppet within the fluid passageway;

a bypass chamber fluidly connected by a bypass input channel to the fluid passageway at a first location and fluidly connected by a bypass output channel to the fluid passageway at a second location, the bypass chamber comprising a bypass check valve biased toward a closed position; and

a pump bulb fluidly connected to the fluid passageway between the bypass input channel and bypass output channel along the length of the fluid passageway.